

Concavity and  
The Second Derivative Test Homework

Name \_\_\_\_\_

Determine the open intervals on which the function is concave up or down.

1.  $f(x) = x^3 - 6x^2 + 4$

2.  $g(x) = 2x^2 + \ln x ; x > 0$

3.  $h(x) = x^4 - 4x^3$

4.  $f(x) = \frac{x}{x^2+1}$

Find the points of inflection and discuss the concavity of the graph of the function.

5.  $f(x) = 2x^4 - 8x + 1$

6.  $f(x) = x\sqrt{9-x}$

7.  $f(x) = x \ln x$

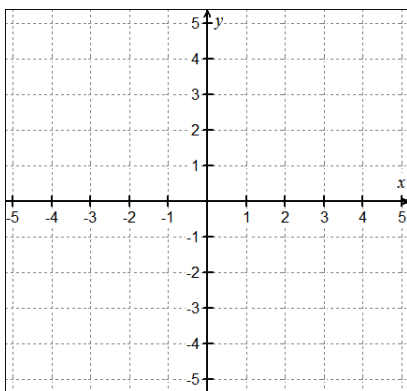
8.  $f(x) = xe^{-x}$

9.  $f(x) = \sin x + \cos x \quad [0, 2\pi]$

10.  $f(x) = \frac{4}{(x^2+1)}$

Sketch the graph of a function  $f$  having the given characteristics.

11.  $f(0) = f(3) = 0$   
 $f'(x) > 0$  if  $x < 1$   
 $f'(x) < 0$  if  $x > 1$   
 $f''(x) < 0$



12.  $f(-2) = f(4) = 0$   
 $f'(2)$  does not exist  
 $f'(x) > 0$  if  $x < 2$  and  $f'(x) < 0$  if  $x > 2$   
 $f''(x) > 0 \quad x \neq 2$

